STIC Search Report
EIC 2800

STIC Database Tracking Number: 125573

TO:	From:
Robert Deberadinis **Location: JEFF 7A15** **Art Unit : 2836** **Friday, June 25, 2004** **Case Serial Number:**	**Bode Fagbohunka** **Location: EIC 2800** **Jeff 4A58** **Phone: 571-272-2541** **bode.fagbohunka@uspto.gov**

Search Notes

Examiner **Robert Deberadinis**

Please find attached the results of your search for The search was conducted using the standard collection of databases on dialog for EIC 2800. The tagged references appear to be the closest references located during our search.

If you would like a re-focus please let me know or if you have any questions regarding the search results please do not hesitate to contact me.

Bode Fagbohunka

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Set     Items   Description
S1   12989734   THERMAL? OR TEMPERATUR? OR HEAT?
S2     862907   SUPERCONDUCT? OR SUPER()CONDUCT?
S3   13847187   SWITCH? OR BUTTON? OR CONTROL? OR KEY? ?
S4    1065388   RF? ? OR RADIO()FREQUENC? OR MICROWAVE? OR MICRO()WAVE?
S5     310646   S1(3N)S2
S6       1794   S5 AND S3 AND S4
S7        151   S5(6N) S3(6N) S4
S8         81   S5(3N) S3(3N) S4
S9         69   S5(2N) S3(2N) S4
S10        55   RD (unique items)
S11      3212   S1 AND S2 AND S3 AND S4
S12      1273   S1 (S)S2 (S) S3 (S) S4
S13       490   S1 (10N)S2 (10N) S3 (10N) S4
S14       241   S1 (5N)S2 (5N) S3 (5N) S4
S15        16   S14 AND IRRADIAT?
S16        25   S13 AND IRRADIAT?
S17        22   S16 NOT S10
S18        13   S15 NOT S10
S19         9   RD (unique items)
? show files
File   2:INSPEC 1969-2004/Jun W2
         (c) 2004 Institution of Electrical Engineers
File   6:NTIS 1964-2004/Jun W3
         (c) 2004 NTIS, Intl Cpyrght All Rights Res
File   8:Ei Compendex(R) 1970-2004/Jun W2
         (c) 2004 Elsevier Eng.  Info. Inc.
File  34:SciSearch(R) Cited Ref Sci 1990-2004/Jun W3
         (c) 2004 Inst for Sci Info
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
         (c) 1998 Inst for Sci Info
File  99:Wilson Appl. Sci & Tech Abs 1983-2004/May
         (c) 2004 The HW Wilson Co.
File  94:JICST-EPlus 1985-2004/May W5
         (c)2004 Japan Science and Tech Corp(JST)
File  92:IHS Intl.Stds.& Specs. 1999/Nov
         (c) 1999 Information Handling Services
File 144:Pascal 1973-2004/Jun W2
         (c) 2004 INIST/CNRS
File 202:Info. Sci. & Tech. Abs. 1966-2004/May 14
         (c) 2004 EBSCO Publishing
File 647:CMP  Computer Fulltext 1988-2004/Jun W2
         (c) 2004 CMP Media, LLC
File 696:DIALOG Telecom. Newsletters 1995-2004/Jun 24
         (c) 2004 The Dialog Corp.
File  35:Dissertation Abs Online 1861-2004/May
         (c) 2004 ProQuest Info&Learning
File  65:Inside Conferences 1993-2004/Jun W3
         (c) 2004 BLDSC all rts. reserv.
File 103:Energy SciTec 1974-2004/Jun B1
         (c) 2004 Contains copyrighted material
File 350:Derwent WPIX 1963-2004/UD,UM &UP=200440
         (c) 2004  Thomson Derwent
File 347:JAPIO Nov 1976-2004/Feb(Updated 040607)
         (c) 2004 JPO & JAPIO
File 239:Mathsci 1940-2004/Aug
         (c) 2004 American Mathematical Society
File  95:TEME-Technology & Management 1989-2004/Jun W1
         (c) 2004 FIZ TECHNIK
File  25:Weldasearch 19662004/Dec
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10/9/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

7334951 INSPEC Abstract Number: B2002-09-2575D-005
Title: Modeling and fabrication of a microelectromechanical switch for H-T/sub c/ superconducting applications
Author(s): Hilerio, I.O.; Reid, J.R.; Derov, J.S.; Babij, T.M.; Larkins, G.
Author Affiliation: ECE Dept., Florida Int. Univ., Miami, FL, USA
Conference Title: Applied Superconductivity 1999. Proceedings of EUCAS 1999, the Fourth European Conference on Applied Superconductivity Part vol.2 p.399-402 vol.2
Editor(s): Obradors, X.; Sandiumenge, F.; Fontcuberta, J.
Publisher: IOP Publishing, Bristol, UK
Publication Date: 2000 Country of Publication: UK 2 vol. (xlviii+xliv+1274+811) pp.
ISBN: 0 7503 0694 7 Material Identity Number: XX-2001-02623
Conference Title: Applied Superconductivity 1999. Proceedings of EUCAS 1999, the Fourth European Conference on Applied Superconductivity
Conference Date: 14-17 Sept. 1999 Conference Location: Sitges, Spain
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P); Theoretical (T); Experimental (X)
Abstract: Microelectromechanical systems (MEMS) technology has demonstrated significant advantages when used as capacitive switches. Our experience in MEMS technology, coupled with that in superconducting thin films, will allow us to obtain better performance parameters. This paper describes the modeling and fabrication of microelectromechanical (MEM) membrane capacitive **switches** suitable for **RF** high **temperature superconducting** applications. The fabrication and theory of operation of these switches is discussed. Models of the electromechanical and microwave properties are presented. Simulation analysis show the switches are capable of attaining low insertion loss (less than 0.2 dB at 20 GHz), and high isolation (greater than 20 dB at 20 GHz). (3 Refs)
Subfile: B
Descriptors: capacitor switching; micromachining; micromechanical devices ; modelling; superconducting microwave devices; superconducting switches
Identifiers: modelling; fabrication; microelectromechanical switch; H-T/sub c/ superconductors; MEMS technology; capacitative switches; superconducting thin films; electromechanical properties; micromechanical properties; simulation analysis; insertion loss; isolation; 20 GHz; 20 dB; 0.2 dB
Class Codes: B2575D (Design and modelling of micromechanical devices); B3220H (High-temperature superconducting materials); B2575F (Fabrication of micromechanical devices); B1350F (Solid-state microwave circuits and devices); B3240M (Superconducting microwave devices)
Numerical Indexing: frequency 2.0E+10 Hz; loss 2.0E+01 dB; loss 2.0E-01 dB

10/9/6 (Item 6 from file: 2)
DIALOG(R)File 2:INSPEC

4997900 INSPEC Abstract Number: B9508-1320-027
Title: An optical switch for high temperature superconducting microwave band reject resonators
Author(s): Raihn, K.F.; Fenzi, N.O.; Soares, E.R.; Matthaei, G.L.
Author Affiliation: Superconductor Technol. Inc., Santa Barbara, CA, USA
Conference Title: 1995 IEEE MTT-S International Microwave Symposium

Digest (Cat. No.95CH3577-4) Part vol.1 p.187-90 vol.1
Editor(s): Kirby, L.
Publisher: IEEE, New York, NY, USA
Publication Date: 1995 Country of Publication: USA 3 vol. (lxxi+xli+1714) pp.
ISBN: 0 7803 2581 8
U.S. Copyright Clearance Center Code: CH3577-4/95/0000-0187$01.00
Conference Title: Proceedings of 1995 IEEE MTT-S International Microwave Symposium
Conference Date: 16-20 May 1995 Conference Location: Orlando, FL, USA
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P)
Abstract: A method for optically switching High Temperature Superconducting (HTS) band reject resonators is presented. Fast low loss switching of HTS filter elements enables digital selection of arbitrary passbands and stop-bands. Patterned pieces of GaAs or silicon are used in the manufacture of the two terminal photoconductive switches. Fiber optic cabling is used to transfer the optical energy from an LED to the switch. The fiber optic cable minimizes the thermal loading of the filter package and de-couples the switch's power source from the RF circuit. This paper discusses the development and implementation of the optical switch and its integration into a switched filter and switched filter-bank. (7 Refs)
Subfile: B
Descriptors: band-stop filters; high-temperature superconductors; microwave filters; optical switches; photoconducting switches; superconducting microwave devices; superconducting resonators; switched filters
Identifiers: optical switch; high temperature superconducting resonators; microwave band reject resonators; fast low loss switching; HTS filter elements; digital selection; two terminal photoconductive switches; fiber optic cabling; LED; switched filter; switched filter-bank; GaAs; Si
Class Codes: B1320 (Waveguide components); B1350 (Microwave circuits and devices); B3240G (Other superconducting material applications and devices); B4250 (Photoelectric devices)
Chemical Indexing:
GaAs int - As int - Ga int - GaAs bin - As bin - Ga bin (Elements - 2)
Si int - Si el (Elements - 1)

10/9/7 (Item 7 from file: 2)
DIALOG(R)File 2:INSPEC

04367328 INSPEC Abstract Number: B9304-3240C-013
Title: A temperature controlled phase shifter on a superconducting film
Author(s): Vendik, O.G.; Samoilova, T.B.
Journal: Pis'ma v Zhurnal Tekhnicheskoi Fizika vol.18, no.17-18 p. 34-9
Publication Date: Sept. 1992 Country of Publication: Russia
CODEN: PZTFDD ISSN: 0320-0108
Translated in: Soviet Technical Physics Letters vol.18, no.9 p.561-3
Publication Date: Sept. 1992 Country of Publication: USA
CODEN: STPLD2 ISSN: 0360-120X
U.S. Copyright Clearance Center Code: 0360-120X/92/090561-03$02.00
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: Microelectronic microwave applications of super-conducting films are currently being developed in two primary areas: the fabrication of high-Q resonance systems and low loss microstrip transmission lines, as well as development of microwave signal control components using certain

nonlinear effects inherent in superconductors. The idea of producing controlled delay lines and phase shifters using microstrip lines with thin dielectrics has been understood for many years. Martens et al. (1991) used **thermal control** of the **superconducting** state for **microwave switches** in a Tl-Ca-Ba-Cu-O film bridge, included in a 50 Omega coplanar transmission line. The temperature of the bridge was changed by using a heater consisting of a normal metal film insulated from the high-T/sub c/ superconductor (HTSC) by photoresist. The response time of HTSC element to thermal input was of the order of 1 mu s, which is certainly adequate for microwave phase shifters. These results provide a foundation for the phase control of microwaves in microstrip devices by temperature. Estimates of the basic parameters of temperature-controlled phase shifting in superconducting microstrip lines are calculated. (11 Refs)

Subfile: B

Descriptors: barium compounds; calcium compounds; high-temperature superconductors; microwave integrated circuits; superconducting integrated circuits; superconducting thin films; thallium compounds

Identifiers: high temperature superconductor; temperature controlled phase shifter; superconducting film; microwave applications; fabrication; high-Q resonance systems; low loss microstrip transmission lines; nonlinear effects; controlled delay lines; thermal control; microwave switches; TlCaBaCuO

Class Codes: B3240C (Superconducting junction devices); B1350H (Microwave integrated circuits)

Chemical Indexing:

TlCaBaCuO ss - Ba ss - Ca ss - Cu ss - Tl ss - O ss (Elements - 5)

10/9/8 (Item 8 from file: 2)

DIALOG(R)File 2:INSPEC

03953514 INSPEC Abstract Number: B91055459

Title: Fast superconducting microwave switch based on electron heating

Author(s): Voronov, B.M.; Gershenzon, E.M.; Gol'tsman, G.N.; Dzardanov, A.L.; Malikov, S.V.

Author Affiliation: V.I. Lenin Moscow State Pedagogical Inst., USSR

Journal: Sverkhprovodimost': Fizika, Khimiya, Tekhnika vol.4, no.2 p.390-4

Publication Date: Feb. 1991 Country of Publication: USSR

Translated in: Superconductivity: Physics, Chemistry, Technology vol.4, no.2 p.336-40

Publication Date: Feb. 1991 Country of Publication: USA

ISSN: 0235-8964

U.S. Copyright Clearance Center Code: 0235-8964/91/020336-05$03.00

Language: English Document Type: Journal Paper (JP)

Treatment: Practical (P); Experimental (X)

Abstract: A fast microwave switch which operates on the basis of electron heating in the resistive state of a superconductor has been developed and studied. The switching element is a microstrip line whose potential conductor is a set of narrow strips of a thin film of a high T/sub c/ superconductor (YBa/sub 2/Cu/sub 3/O/sub 7- delta /) or of a low T/sub c/ superconductor (MoRe, NbN). The topology and thickness of the superconducting potential conductor of the line have been optimized in terms of the electrodynamic characteristics of the line (its transfer ratio and its standing-wave ratio) in the conducting and nonconducting states and also in terms of the **switching** current. The utilization of electron **heating** in **superconducting microwave switches** makes it possible to reduce the switching current substantially (by two orders of magnitude) from that required in corresponding bolometric-effect devices. In addition, there is an increase in speed. Microwave switches based on YBa/sub 2/Cu/sub

3/OI/sub 7- delta / films designed for operation in the frequency range 3-12 GHz at liquid-nitrogen temperature have a signal loss of 0.5 dB in the conducting state and 20 dB in the nonconducting state. Their switching current is 30 mA. The physical switching time is estimated to be approximately 10/sup -12/ s. The MoRe and NbN switches (T=4.2 K) have a longer switching time (0.2-0.5 ns) and a lower control current (approximately 10 mA). (5 Refs)
Subfile: B
Descriptors: barium compounds; high-temperature superconductors; molybdenum alloys; niobium compounds; rhenium alloys; solid-state microwave devices; strip line components; superconducting integrated circuits; superconducting junction devices; superconducting thin films; switches; type II superconductors; yttrium compounds
Identifiers: high temperature superconductivity; fast microwave switch; electron heating; resistive state; microstrip line; thin film; topology; electrodynamic characteristics; transfer ratio; standing-wave ratio; bolometric-effect devices; liquid-nitrogen temperature; signal loss; switching time; control current; 3 to 12 GHz; YBa/sub 2/Cu/sub 3/O/sub 7-delta /; MoRe; NbN
Class Codes: B1350F (Solid-state circuits and devices); B2180B (Relays and switches); B1320 (Waveguide components); B3240C (Superconducting junction devices)
Chemical Indexing:
YBa2Cu3O int - Ba2 int - Cu3 int - Ba int - Cu int - O int - Y int - YBa2Cu3O ss - Ba2 ss - Cu3 ss - Ba ss - Cu ss - O ss - Y ss (Elements - 4)
MoRe int - Mo int - Re int - MoRe bin - Mo bin - Re bin (Elements - 2)
NbN int - Nb int - N int - NbN bin - Nb bin - N bin (Elements - 2)
Numerical Indexing: frequency 3.0E+09 to 1.2E+10 Hz

10/9/10 (Item 2 from file: 6)
DIALOG(R)File 6:NTIS

2006888 NTIS Accession Number: AD-A323 656/9
High Temperature Superconducting Microwave Switch
(Interim rept. Apr 95-Jun 96)
Neel, M. M.
Naval Air Warfare Center, China Lake, CA. Weapons Div.
Corp. Source Codes: 106405001; 424089
Report No.: NAWCWPNS-TP-8335
Dec 96 98p
Languages: English
Journal Announcement: GRAI9716

NTIS Prices: PC A06/MF A02
Country of Publication: United States
This report presents the design, construction, and testing of a high **temperature superconducting microwave switch** . The circuit is implemented in microstrip transmission line geometry and utilizes voltage and or current to create the switching action. Results of RF power limiting are also presented.
Descriptors: *High temperature superconductors; *Switching circuits; Test and evaluation; Voltage; Transmission lines; Microwave equipment; Laser applications; Strip transmission lines; Direct current; Circuit analysis; Radiofrequency power; Electronic switching
Identifiers: Microwave switches; NTISDODXA
Section Headings: 49F (Electrotechnology--Power and Signal Transmission

Devices)

10/9/21 (Item 9 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

04100563 E.I. No: EIP95022594081
Title: Power-induced switching in YBa//2Cu//3O//7 microwave coplanar resonators
Author: Porch, Adrian; Portis, Alan M.
Corporate Source: Univ of Birmingham, Birmingham, Engl
Conference Title: Proceedings of the International Conference on Superconductivity High Temperature Superconductors IV. Part V
Conference Location: Grenoble, Fr Conference Date: 19940705-19940709
E.I. Conference No.: 42501
Source: Physica C: Superconductivity v 235-240 n pt 5 Dec 1994. p 3381-3382
Publication Year: 1994
CODEN: PHYCE6 ISSN: 0921-4534
Language: English
Document Type: JA; (Journal Article) Treatment: T; (Theoretical); X; (Experimental)
Journal Announcement: 9505W1
Abstract: We have studied the power-induced switching of a number of thin film YBa//2Cu//3O//7 (YBCO) coplanar transmission line resonators at 8GHz. Switching occurs at current densities around 10**6 - 10**7 Acm** minus **2 at low T, where it is hysteretic; at higher T it becomes non-hysteretic, and washes out in a narrow temperature range which we believe corresponds to the critical temperature T//c//j of a single responsible weak link. We develop a thermal model which accounts for all of the observed features of the switching. (Author abstract) 3 Refs.
Descriptors: Resonators; **Superconducting** films; High **temperature superconductors** ; Yttrium compounds; **Microwave** devices; **Switching** ; Electric lines; Current density; Hysteresis; Mathematical models
Identifiers: Microwave coplanar resonator; Power induced switching; Narrow temperature range; Critical temperature; Nonlinear effects; Peak edge current density; Hysteretic switching; Microwave radiation; Surface impedance; Thermal reservoir
Classification Codes:
708.3 (Superconducting Materials); 804.2 (Inorganic Components); 706.2 (Electric Power Lines & Equipment); 921.6 (Numerical Methods)
714 (Electronic Components); 708 (Electric & Magnetic Materials); 804 (Chemical Products); 711 (Electromagnetic Waves); 706 (Electric Transmission & Distribution); 921 (Applied Mathematics)
71 (ELECTRONICS & COMMUNICATIONS); 70 (ELECTRICAL ENGINEERING); 80 (CHEMICAL ENGINEERING); 92 (ENGINEERING MATHEMATICS)

10/9/23 (Item 11 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

02920194 E.I. Monthly No: EI9007085775
Title: Compact cryogenic attachment for Mossbauer spectroscopy with microwave excitation.
Author: Didenko, N. P.; Amelin, G. P.; Zelentsov, V. I.; Kaminskii, V. L. ; Fedorov, N. P.; Fal'kovich, V. M.
Corporate Source: Tomsk Polytechnic Inst, USSR
Source: Instruments and Experimental Techniques (English Translation of Pribory I Tekhnika Eksperimenta) v 31 n 4 pt 2 Feb 1989 p 1045-1048

Publication Year: 1989
CODEN: INETAK ISSN: 0020-4412
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 9007
Abstract: A compact cryogenic attachment is described that is placed on a standard helium Dewar flask and permits recording of Mossbauer spectra with excitation by millimeter-band radiation in the temperature range of 4.3-300 degree K. The design of the attachment allows operation with various gamma-radiation detectors in both horizontal and vertical Mossbauer measurement geometries and its placement in superconducting magnets with a large 'warm' zone. (Author abstract) 6 Refs.
Descriptors: *SPECTROMETERS, GAMMA RAY--*Accessories; SPECTROSCOPY, MOSSBAUER; CRYOGENICS--Applications; HEAT EXCHANGERS--Cryogenic; MICROWAVE DEVICES; BIOLOGICAL MATERIALS--Spectroscopic Analysis
Identifiers: GAMMA RADIATION DETECTORS; METHEMOGLOBIN; **MICROWAVE** EXCITATION; NUCLEAR RAMAN SPECTROSCOPY; **SUPERCONDUCTING** MAGNETS; **TEMPERATURE CONTROL**
Classification Codes:
944 (Moisture, Pressure & Temperature, & Radiation Measuring Instruments); 644 (Refrigeration & Cryogenics); 616 (Heat Exchangers); 731 (Automatic Control Principles); 931 (Applied Physics); 714 (Electronic Components)
94 (INSTRUMENTS & MEASUREMENT); 64 (HEAT & THERMODYNAMICS); 61 (PLANT & POWER ENGINEERING); 73 (CONTROL ENGINEERING); 93 (ENGINEERING PHYSICS); 71 (ELECTRONICS & COMMUNICATIONS)

10/9/24 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

11866736 Genuine Article#: 702UB Number of References: 14
Title: Fabrication of a superconducting MEM shunt switch for RF applications
Author(s): Hijazi YS (REPRINT) ; Hanna D; Fairweather D; Vlasov YA; Larkins GL
Corporate Source: Florida Int Univ,Miami//FL/33174 (REPRINT); Florida Int Univ,Miami//FL/33174
Journal: IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY, 2003, V13, N2,1 (JUN), P700-703
ISSN: 1051-8223 Publication date: 20030600
Publisher: IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC, 445 HOES LANE, PISCATAWAY, NJ 08855 USA
Language: English Document Type: ARTICLE
Geographic Location: USA
Journal Subject Category: ENGINEERING, ELECTRICAL & ELECTRONIC; PHYSICS, APPLIED
Abstract: We have developed a fabrication process for a superconducting MicroElectroMechanical (MEM) shunt switch. The design of the switch has been optimized using Sonnet simulations. The switch consists of a YBa2 Cu-3 O-7 Coplanar Waveguide (CPW) transmission line with a gold membrane bridge anchored at the ground planes and suspended above an area of the center conductor covered with BaTiO3. Under an applied electric field this membrane bridge actuates downwards and shunts the RF signal to ground. The membrane returns to its original shape when the electric field is removed. In the up position the device exhibits an s(21) insertion loss of less than 0.25 dB from dc through 900 MHz (most of which is due to radiated loss). In the down position the s(21) loss in the same frequency range is greater than 30 dB.
Descriptors--Author Keywords: high- **temperature superconductors** ;

microelectromechanical devices ; **microwave** devices ; **switches**
Cited References:
BARKER NS, 1998, V46, P198, IEEE T MICROW THEORY
BROWN ER, 1998, V46, P1868, IEEE T MICROW THEO 2
HIJAZI YS, UNPUB IEEE T APPL SU
HILERIO GM, 1999, THESIS FLORIDA INT U
KIM CJ, 1998, V64, P17, SENSOR ACTUAT A-PHYS
MULDAVIN JB, 1999, V4, P1511, IEEE 1999 IMS DIGEST
MULDAVIN JB, 2000, V48, P1045, IEEE T MICROW THEORY
PACHECO SP, 2000, V1, P165, IEEE MTT S INT MICR
PACHECO S, 1998, P1569, IEEE MTT S
PARK JY, P639, 13 INT C MICR SYST M
PARK JY, 2001, V89, P88, SENSOR ACTUAT A-PHYS
REBEIZ GM, 2001, V2, P59, IEEE MICROWAVE MAGAZ
SOCORREGUT R, P437, P INT CRYOG MAT C 20
YAO ZJ, 1999, V8, P129, J MICROELECTROMECH S

10/9/25 (Item 2 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

11866735 Genuine Article#: 702UB Number of References: 19
Title: Design of a superconducting MEM shunt switch for RF applications
Author(s): Hijazi YS (REPRINT) ; Vlasov YA; Larkins GL
Corporate Source: Florida Int Univ,Miami//FL/33174 (REPRINT); Florida Int Univ,Miami//FL/33174
Journal: IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY, 2003, V13, N2,1 (JUN), P696-699
ISSN: 1051-8223 Publication date: 20030600
Publisher: IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC, 445 HOES LANE, PISCATAWAY, NJ 08855 USA
Language: English Document Type: ARTICLE
Geographic Location: USA
Journal Subject Category: ENGINEERING, ELECTRICAL & ELECTRONIC; PHYSICS, APPLIED
Abstract: We have designed, simulated and optimized a capacitively shunted RF MicroElectroMechanical (MEM) superconducting switch. The switch consists of a High Temperature Superconducting (HTS) YBa2 Cu-3 O-7 coplanar waveguide (CPW) structure with a gold membrane bridge suspended above the center conductor and anchored at the ground planes (air gap 3 mum). A thin layer of BaTiO3, in the shape of a patch, lies on top of the center conductor and underneath the suspended gold membrane. Under an applied voltage, the gold bridge membrane actuates downwards and collapses on top of the dielectric layer of BaTiO3 thereby capacitively shunting the RF signal to ground. Using Sonnet, simulations were conducted to optimize the switch design. An analysis of these results revealed interesting relationships between the switch mechanical and electrical parameters; this paper discusses and analyzes these results, along with measured data.
Descriptors--Author Keywords: high- **temperature superconductors** ; microelectromechanical devices ; **microwave** devices ; **switches** ; YBa2Cu3O7
Cited References:
BARKER NS, 1998, V46, P198, IEEE T MICROW THEORY
BAZIN G, 2000, V9, P75, EUR PHYS J-APPL PHYS
BROWN ER, 1998, V46, P1868, IEEE T MICROW THEO 2
HIJAZI YS, UNPUB IEEE T APPL SU
HILERIO, 1999, THESIS FLORIDA INT U
KRAUS JD, 1992, ELECTROMAGNETICS
MALUF N, 2000, INTRO MICROELECTROME

MULDAVIN JB, 1999, V4, P1511, IEEE 1999 IMS DIGEST
MULDAVIN JB, 2000, V48, P1045, IEEE T MICROW THEORY
PACHECO SP, 2000, V1, P165, IEEE MTT S INT MICR
PACHECO S, 1998, P1569, IEEE MTT S
PARK JY, 2000, P639, 13 INT C MICR EL MEC
PARK JY, 2001, V89, P88, SENSOR ACTUAT A-PHYS
PETERSEN KE, 1979, V23, P376, IBM J RES DEV
REBEIZ GM, 2001, V2, P59, IEEE MICROWAVE MAGAZ
SHEN ZY, 1995, V3, HIGH TEMPERATURE SUP
SIEGEL MS, 1965, MECH DESIGN MACHINES
SIERACKI V, 2000, 2000 AOC RAD EW C SE
YAO ZJ, 1999, V8, P129, J MICROELECTROMECH S

10/9/26 (Item 3 from file: 34)

DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

09358300 Genuine Article#: 396FB Number of References: 13
Title: Switching device based on RF-field-driven high-T-C SQUID
Author(s): Kondo T (REPRINT) ; Mizugaki Y; Saito K; Nakajima K; Yamashita T
Corporate Source: Sendai Natl Coll Technol,Sendai/Miyagi 9893124/Japan/ (REPRINT); Sendai Natl Coll Technol,Sendai/Miyagi 9893124/Japan/; Tohoku Univ,Res Inst Elect Commun,Sendai/Miyagi 9808577/Japan/; Tohoku Univ,New Ind Creat Hatchery Ctr,Sendai/Miyagi 9808579/Japan/
Journal: IEICE TRANSACTIONS ON ELECTRONICS, 2001, VE84C, N1 (JAN), P55-60
ISSN: 0916-8524 Publication date: 20010100
Publisher: IEICE-INST ELECTRONICS INFORMATION COMMUNICATIONS ENG, KIKAI-SHINKO-KAIKAN BLDG MINATO-KU SHIBAKOEN 3 CHOME, TOKYO, 105, JAPAN
Language: English Document Type: ARTICLE
Geographic Location: Japan
Journal Subject Category: ENGINEERING, ELECTRICAL & ELECTRONIC
Abstract: A voltage mode logic device based on RF-Field-driven DC-SQUID (RFDS) using high-T-C superconducting Josephson junctions has been proposed. RFDS produces large RF-induced steps, and the orders of steps are strongly selected DC magnetic flux crossing the SQUID loop superposing with RF magnetic field. In this paper. we present the experimental results of RFDS fabricated bq using YBCO grain boundary Josephson junctions. The results are evaluated with numerical simulations. The enhancement of RF-induced steps, the strong selection of step orders and the switching performance are demonstrated.
Descriptors--Author Keywords: RF-induced step ; **RF** flux ; SQUID ; **switching** device ; high **temperature** **superconductor**
Identifiers--KeyWord Plus(R): LOGIC
Cited References:
DENG ZJ, 1999, V9, P7, IEEE T APPL SUPERCON
FANG ES, 1989, P407, 1989 INT SUP EL C
LEE GS, 1993, V3, P2740, IEEE T APPL SUPERCON
LIKHAREV KK, 1991, V1, P3, IEEE T APPL SUPERCON
MIZUGAKI Y, 1999, V12, P9925, SUPERCOND SCI TECH
MIZUGAKI Y, 1996, V6, P90, IEEE T APPL SUPERCON
MIZUGAKI Y, 2000, V39, P55, JPN J APPL PHYS 1
MIZUGAKI Y, 1999, V9, P4677, IEEE T APPL SUPERCON
RUSSER P, 1972, V43, P2008, J APPL PHYS
SAITOH K, 1998, V72, P2754, APPL PHYS LETT
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10/9/42 (Item 1 from file: 103)

DIALOG(R)File 103:Energy SciTec
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04186133 GRA-97-00394; EDB-97-094837
Title: High temperature superconducting microwave switch . **Interim report, April 1995-June 1996**
Author(s)/Editor(s): Neel, M.M.
Corporate Source: Naval Air Warfare Center, China Lake, CA (United States). Weapons Div. (Code: 9533160)
Publication Date: Dec 1996
(98 p)
Report Number(s): AD-A-323656/9/XAB NAWCWPNS-TP--8335
Document Type: Report; Progress Report
Language: English
Journal Announcement: EDB9715
Availability: NTIS
Distribution: (Report):9 (MF):6 ND-00
Subfile: ERA (Energy Research Abstracts); ETD (Energy Technology Data Exchange). GRA (NTIS NTS)
US DOE Project/NonDOE Project: NP
Country of Origin: United States
Country of Publication: United States
Abstract: This report presents the design, construction, and testing of a high **temperature superconducting microwave switch** . The circuit is implemented in microstrip transmission line geometry and utilizes voltage and or current to create the switching action. Results of RF power limiting are also presented.
Major Descriptors: *MICROWAVE RADIATION -- SWITCHES; *SWITCHES -- CONSTRUCTION; *SWITCHES -- DESIGN
Descriptors: HIGH-TC SUPERCONDUCTORS; MICROWAVE EQUIPMENT; PROGRESS REPORT; SWITCHING CIRCUITS; TESTING; USES
Broader Terms: DOCUMENT TYPES; ELECTRICAL EQUIPMENT; ELECTROMAGNETIC RADIATION; ELECTRONIC CIRCUITS; ELECTRONIC EQUIPMENT; EQUIPMENT; RADIATIONS; SUPERCONDUCTORS; TYPE-II SUPERCONDUCTORS
Subject Categories: 665412* -- Superconducting Devices -- (1992-)

10/9/43 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX
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016066293 **Image available**
WPI Acc No: 2004-224144/200421
XRAM Acc No: C04-088376
XRPX Acc No: N04-176995
Radio frequency **magnetic latching** switch **for high** temperature superconductor **based** RF **receiver, has ferromagnetic contact pads arranged on both sides of magnet of each switch assembly**
Patent Assignee: SUPERCONDUCTOR TECHNOLOGIES IN (SUPE-N)
Inventor: BILSKI S M; COSTA J R; HEY-SHIPTON G L; SAITO E R
Number of Countries: 103 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20040005871	A1	20040108	US 2002190328	A	20020705	200421	B
WO 200406276	A2	20040115	WO 2003US19567	A	20030620	200421	

Priority Applications (No Type Date): US 2002190328 A 20020705
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20040005871	A1		35	H04B-001/18	
WO 200406276	A2	E		H01H-000/00	

Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NI NO NZ OM PH PL PT RO RU SC SD SE SG SK SL TJ TM TN TR TT TZ UA UG UZ VC VN YU ZA ZM ZW
Designated States (Regional): AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS LU MC MW MZ NL OA PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW

Abstract (Basic): US 20040005871 A1

NOVELTY - Each switch assembly has a magnet provided on end of a cantilever and a pair of ferromagnetic contact pads arranged on both side of the magnet. An electromagnetic (EM) source generates EM field to transition the switch assembly between high temperature superconductor (HTS) state and bypass state. A fail safe circuit transition the state of switch assembly during failure of the EM source.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) HTS-based radio frequency (RF) receiver; and

(2) method of operating RF receiver.

USE - RF magnetic latching switch e.g. reed-type bypass switches rotary-type bypass switch used in HTS-based RF receiver (claimed) or non-HTS based RF receiver.

ADVANTAGE - Due to the use of ferromagnetic contact pads, a need for continuous supply of power to the reed switch for maintaining its state, is eliminated. The RF receiver using the switch, has excellent bypass capability regardless of whether the receiver is HTS or non-HTS based.

DESCRIPTION OF DRAWING(S) - The figure shows a schematic view of the HTS-based RF receiver.

HTS-based RF receiver (100)

HTS filter (106)

cryogenic enclosure (110)

antenna (120)

RF switch (130)

pp; 35 DwgNo 1/18

Title Terms: RADIO; FREQUENCY; MAGNETIC; LATCH; SWITCH; HIGH; TEMPERATURE; SUPERCONDUCTING; BASED; RF; RECEIVE; FERROMAGNETIC; CONTACT; PAD; ARRANGE ; SIDE; MAGNET; SWITCH; ASSEMBLE

Derwent Class: A85; L03; U24; V03; W02

International Patent Class (Main): H01H-000/00; H04B-001/18

File Segment: CPI; EPI

Manual Codes (CPI/A-N): A12-E; A12-E07; A12-E08; L03-B04A

Manual Codes (EPI/S-X): U24-E04; V03-C06A; V03-U05; W02-G03A1

Polymer Indexing (PS):

<01>

001 2004; R00975 G0022 D01 D12 D10 D51 D53 D59 D69 D82 F- 7A; H0000; P0511

002 2004; Q9999 Q7498 Q7330; Q9999 Q7421-R Q7330; K9347-R K9790; ND01; K9416

10/9/44 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

013132245 **Image available**

WPI Acc No: 2000-304116/200027

XRPX Acc No: N00-227245

High temperature superconductive microwave switch **for use in a**

radio frequency back up system, has a switch circuit that is controlled by a DC signal

Patent Assignee: COM DEV LTD (COMC-N)
Inventor: MANSOUR R
Number of Countries: 001 Number of Patents: 002
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
CA 2251517	A	19990113	CA 2251517	A	19981113	200027	B
CA 2251517	C	20000718	CA 2251517	A	19981113	200045	

Priority Applications (No Type Date): CA 2251517 A 19981113
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
CA 2251517	A		28	H01P-001/10	
CA 2251517	C	E		H01P-001/10	

Abstract (Basic): CA 2251517 A

NOVELTY - The switch (2) consists of two circuits (4,6) they are made from metallic film placed on to a substrate and are coupled together. Layer (4), consists of a high temperature superconductive (HTS) circuit, . Layer (6) consists of a circuit made from a technology such as micro-electro-mechanical system, MEMS or flip-chip technology. The second layer has a switch circuit that is controlled by a DC signal.

USE - High **temperature superconductive microwave** switches can be used to replace both electromechanical and solid state switches in both low and high speed applications

ADVANTAGE - The advantages are low insertion loss, small size, light weight and low power consumption. The HT switches combines incompatible components together.

DESCRIPTION OF DRAWING(S) - Switch (2)
High temperature superconductive circuit (4)
MEMS comparable technology circuit (6)
pp; 28 DwgNo 1/10

Title Terms: HIGH; TEMPERATURE; SUPERCONDUCTING; MICROWAVE; SWITCH; RADIO; FREQUENCY; BACK; UP; SYSTEM; SWITCH; CIRCUIT; CONTROL; DC; SIGNAL
Derwent Class: U21; U25; W02
International Patent Class (Main): H01P-001/10
International Patent Class (Additional): H01P-005/02; H03H-002/00; H03K-017/92
File Segment: EPI
Manual Codes (EPI/S-X): U21-B01X; U25-D01; W02-A04A5; W02-G08A

10/9/45 (Item 3 from file: 350)

010042897 **Image available**
WPI Acc No: 1994-310608/199438
XRPX Acc No: N94-244305

Reflective high temp superconducting switch - has actuation device for controllably heating portion of superconductor sufficiently to have normal not superconducting conductivity

Patent Assignee: US DEPT ENERGY (USAT)
Inventor: HIETALA V M; HOHENWARTER G K G; MARTENS J S
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 5350739	A	19940927	US 92950570	A	19920924	199438	B

Priority Applications (No Type Date): US 92950570 A 19920924
Patent Details:
Patent No Kind Lan Pg Main IPC Filing Notes
US 5350739 A 9 H01B-012/02

Abstract (Basic): US 5350739 A

The high **temperature superconducting** (HTS) **microwave switch** includes a HTS conductor device for providing a superconducting path for a microwave signal. The device includes a switching portion having a reduced cross-sectional area w.r.t. the remainder of the conductor device. An actuation device is provided for controllably heating the portion of the conductor device sufficiently to cause the portion to have normal, and not superconducting, resistivity.

A second conductor device is spaced from and parallel to the HTS conductor device, e.g. the latter and the second conductor device comprise a transmission line for the microwave signal. The switch transmits the signal when the actuation device is not heating the portion, and reflects the signal when the actuation device is heating the portion.

USE/ADVANTAGE - In switched delay line phase and microwave signal distribution networks. Provision for at least 30dB of isolation and switches in less than 1 microsecond, being thermally activated with enhanced flux flow.

Dwg.1/4

Title Terms: REFLECT; HIGH; TEMPERATURE; SUPERCONDUCTING; SWITCH; ACTUATE; DEVICE; CONTROL; HEAT; PORTION; SUPERCONDUCTING; SUFFICIENT; NORMAL; SUPERCONDUCTING; CONDUCTING
Derwent Class: U14; U21
International Patent Class (Main): H01B-012/02
International Patent Class (Additional): H01L-039/12; H01P-001/10; H03K-017/92
File Segment: EPI
Manual Codes (EPI/S-X): U14-F02B; U21-B01X

10/9/55 (Item 1 from file: 62)
DIALOG(R)File 62:SPIN(R)

00793274

Use of magnetic field screening by high- temperature superconducting **films to** switch microwave **signals**

Burbaev, T. M. ; Krasnosvobodtsev, S. I. ; Kurbatov, V. A. ; Malakshinov, N. P. ; Nozdrin, V. S. ; Penin, N. A.
P. N. Lebedev Physics Institute, Russian Academy of Sciences, Moscow
TECH. PHYS. LETT.; 24(7),533-535 (Jul. 1998) CODEN: TPLEE
Work Type: EXPERIMENTAL

The efficiency with which YBCO films screen an alternating magnetic field near the superconducting transition was measured. In the decimeter range measurements were made of the characteristics of a switch whose operating principle was based on the change in the screening of an alternating magnetic field by a superconducting transition. (Copyright) 1998 American Institute of Physics.

PACS: *74.76.Bz, 74.72.Bk, 84.40.Az, 85.25.-j
Descriptors: high-temperature superconductors ; yttrium compounds ; barium compounds ; superconducting thin films ; **superconducting** transition **temperature** ; **superconducting switches** ; **superconducting microwave** devices ; electromagnetic wave absorption
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